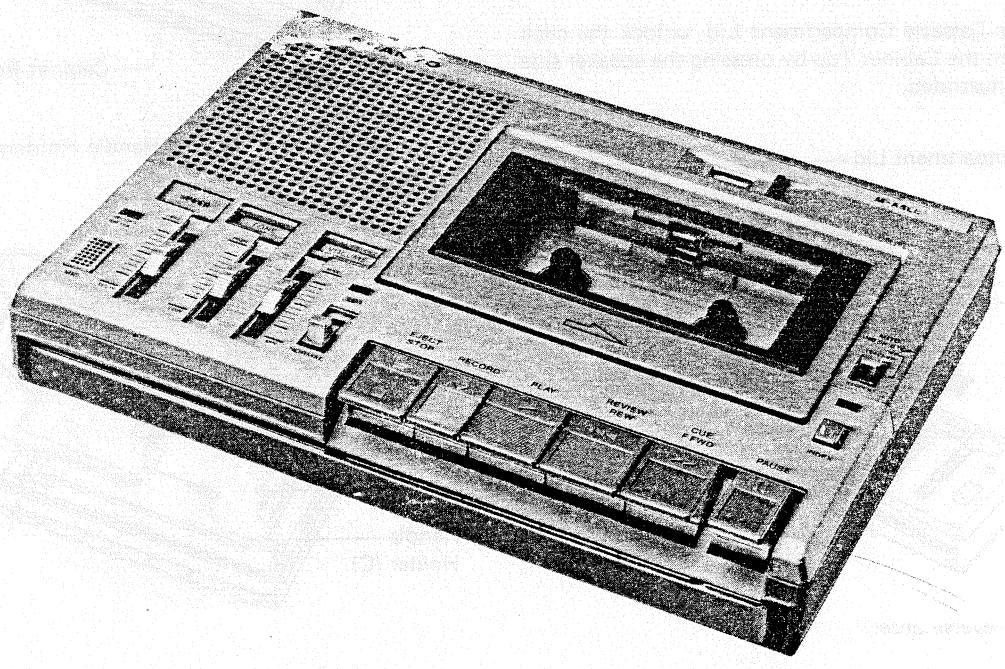
SERVICE MANUAL

SANYO

LL CASSETTE RECORDER

M-A5LL

EUROPE



142 312 04

SPECIFICATIONS

Power Source	
DC	7.5V (UM-3, HP 7, AA Cell, Mignonzellen, R6) x 5
Output Power	600mW (at 10% Distortion)
Current Consumption (at Vol. min.)	
Record mode	165mA (LL mode 175mA)
Playback mode	145mA
Fast Forward mode	175mA
Rewind mode	175mA
Recording System	AC Bias
Erasing System	AC Erasing
Tape Speed	1-7/8ips. ±3%
Wow & Flutter	0.4% (WRMS)
Fast Forward Time	150sec. (C-60 cassette)
Rewind Time	150sec. (C-60 cassette)
Frequency Response	250 – 6,300Hz
Erase Ratio (Overall)	52dB
Signal to Noise Ratio	40dB
Crosstalk (Track to Track)	50dB
Channel Separation	40dB (LL mode)
Harmonic Distortion (K3)	5% (at 1V Output Level)
Hum & Noise	
At Vol. Max.	–28dBs
At Vol. Min.	–60dBs
Oscillation Frequency	40kHz

–Specifications subject to change without notice.–

DISASSEMBLY INSTRUCTIONS

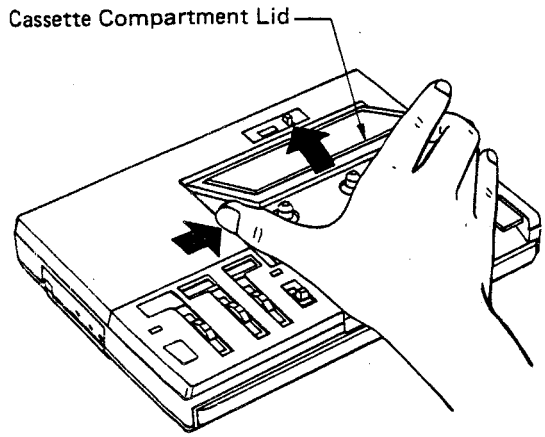
NOTES ON ASSEMBLY

- Spread a soft rubber mat or a soft cloth on the workbench before disassembly of the unit.
- Proceed with a disassembly work without making any scratches and grease stains on the unit.
- When the unit is reassembled, note the kinds of the screws and leads.
- Refer to "Circuit Diagram" and "Exploded Views" to ensure the correct assembly.

CASSETTE LID REMOVAL

1. Open the Cassette Compartment Lid by pressing the Stop/Eject button.

2. To remove the Cassette Compartment Lid, unlock the click of the Lid from the Cabinet Top by pressing the speaker side of the Lid as illustrated.

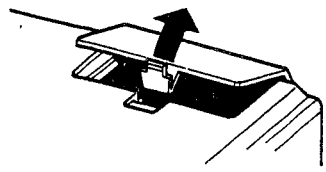


3. Reassemble in reverse order.

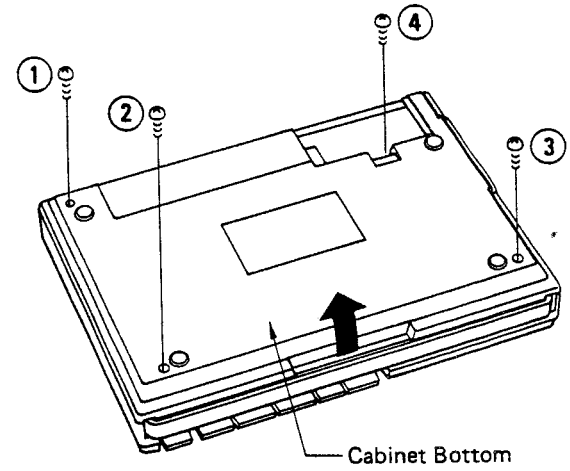
CABINET BOTTOM REMOVAL

1. Open the Cassette Compartment Lid by pressing the Stop/Eject button and take out the cassette tape.

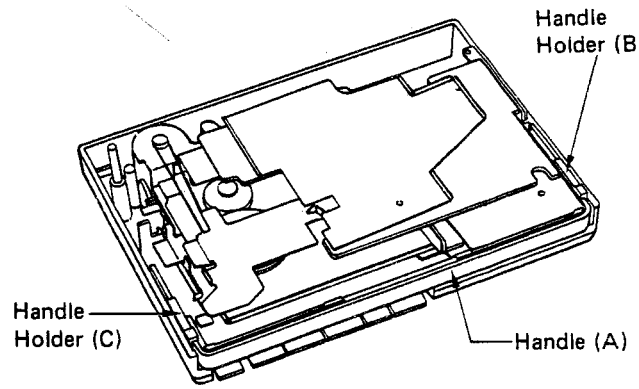
2. Turn over the unit and open the battery compartment lid. Then, take out the batteries from the compartment.



3. Remove the four screws (1 – 4) fastening the Cabinet Bottom and lift the handle side of the Cabinet Bottom in the direction of the arrow. Then, remove the Cabinet Bottom, noting the leads from the battery terminals.



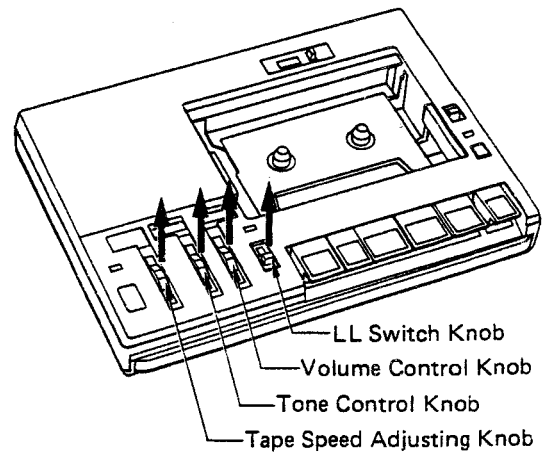
4. The Handle (A) and two Handle Holders (B and C) can also be removed.



5. Reassemble in reverse order.

MECHANISM CHASSIS REMOVAL

1. Remove the cassette compartment lid and pull out the tape speed control, tone control, volume control, and LL switch knobs from the shafts.

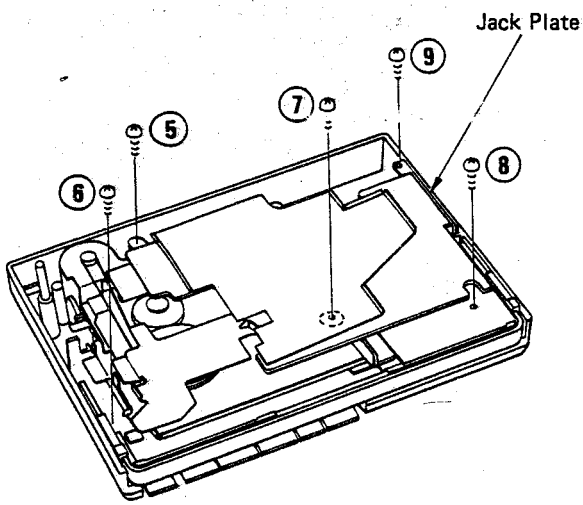


DISASSEMBLY INSTRUCTIONS (Continued)

2. Turn over the unit and remove the Cabinet Bottom.

3. Unsolder the speaker leads (violet and green), battery terminal leads (red and black), and built-in microphone leads (green and yellow) from the Amplifier P.C.Board.

4. Remove the five screws (5 – 9) fastening the Chassis and detach the Mechanism Chassis with the Amplifier P.C.Board from the Cabinet Top, noting the arranged leads.
   Note that the Jack Plate is also detached with the Chassis and P.C.Board.

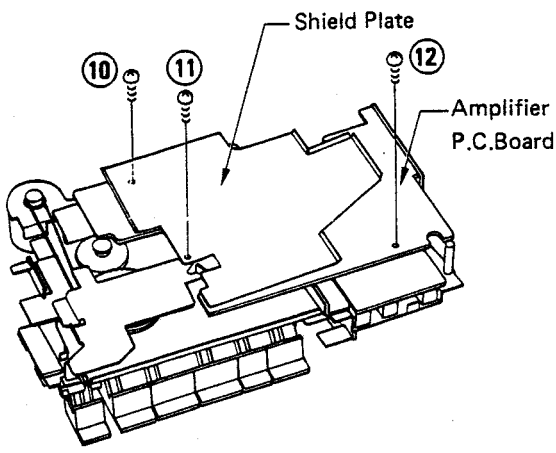


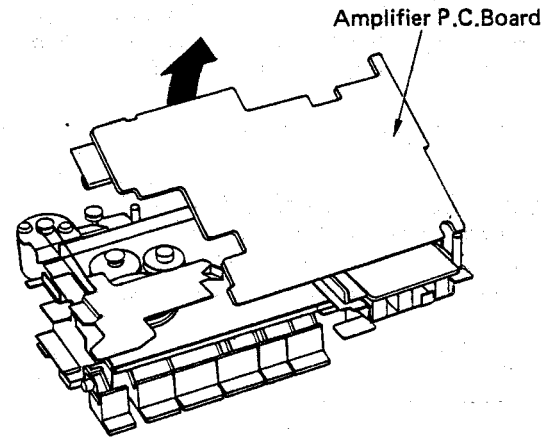
5. Reassemble in reverse order.

AMPLIFIER P.C.BOARD REMOVAL

1. Remove the Mechanism Chassis from the unit by following its removal instruction and unsolder the power switch leads (white and pink), F.FWD/REW switch leads (violet and gray), and motor leads (red and black).

2. Remove the screw (10) fastening the Amplifier P.C.Board and detach the shield plate. Then, remove the two screws (11 and 12) fastening the P.C.Board and detach the Amplifier P.C.Board by lifting its motor side in direction of the arrow as illustrated.





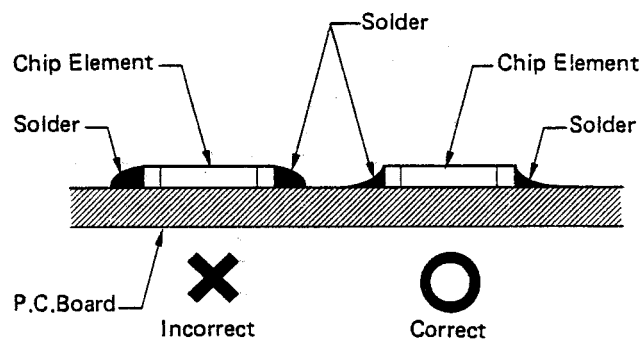
NOTE:
When the Amplifier P.C.Board is mounted on the Chassis, correctly fit the R/P switch to the Record Lever and the LL switch to the spring of the LL Plate. Then, tighten the screws for the Amplifier P.C.Board.

NOTES ON HANDLING THE CHIP ELEMENT

Pay due caution to the following items;

1. Do not use the removed chip element again.

2. Use a soldering iron of less than 30W.
   * The soldering iron should not touch the body of the chip element.
   * Complete soldering in a short time.
   * Apply solder to the chip element as illustrated below.



MECHANICAL ADJUSTMENTS

GENERAL REMARKS

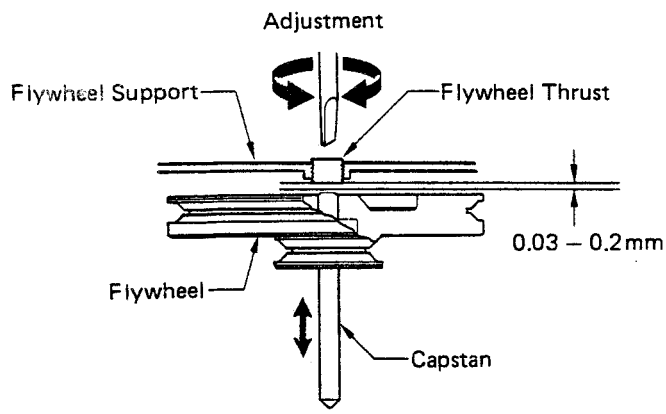
1. Before adjusting the mechanism of the unit, wipe the tape contacting surfaces clean as well as the rubber surfaces of the driving parts with a soft cloth soaked in alcohol. Trouble may occur because of oil and grease stains.

2. Keep the belts clean while the adjustments are performed.

FLYWHEEL THRUST ADJUSTMENT

The clearance between the Flywheel Thrust and the Flywheel should be 0.03 – 0.2 mm with the Chassis turned over.
If necessary, adjust the clearance by the following procedures.

1. While moving the Capstan up and down, slowly turn the Flywheel Thrust clockwise to obtain the clearance of "0" (zero) between the Thrust and the Flywheel.



NOTE:
Do not turn the Flywheel Thrust forcibly.

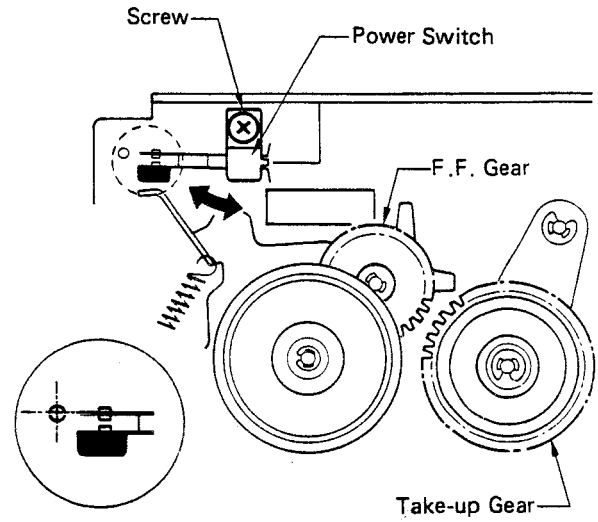
2. Turn the Thrust counter-clockwise by 45° – 90°.

3. After the adjustment, secure the Thrust with paint or glue.

POWER SWITCH POSITION ADJUSTMENT

1. Check to see that the Power Switch is positioned over the center of the chassis adjusting hole as illustrated.

2. If necessary, loosen the screw fastening the Switch and adjust the switch position by moving the Switch.



Position the Switch over the center of the adjusting hole.

3. After tightening the screw, check the switch movement as follows:
   * Set the unit in the playback mode and slowly push the F.FWD button. Then, check that the Power Switch is changed over from "Close" to "Open", and that it is changed to "Close" again after the Take-up Gear meshes with the FF Gear.

4. Check that the Power Switch functions properly. Then, secure the screw with paint or glue.

ELECTRICAL ADJUSTMENTS

EQUIPMENT REQUIRED

- VTVM
- Frequency Counter
- DC Constant-Voltage Regulator
- Attenuator
- Audio Signal Generator
- Dummy Load (8ohm)
- Test Tape
  - * 3kHz Test Tape (Example: TEAC MTT-111) for Tape Speed Adjustment
  - * 6.3kHz Test Tape (Example: TEAC MTT-113) for Head Azimuth Adjustment
- Test Tape for Recording and Playback Operations
  - * Normal Tape
- Alignment Tool

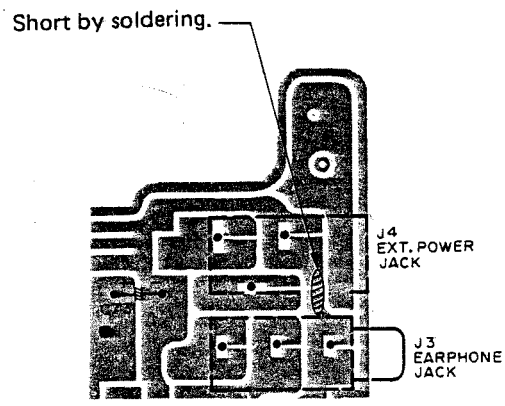
BEFORE ADJUSTMENT

Unless otherwise specified, set the unit and measuring instruments as follows:

* Tape Speed Control . . . . . Click Position (Center)
* Tone Control . . . . . Maximum
  (Teacher Volume Control when the LL system is used)
* Volume Control . . . . . Arbitrary
  (Student Volume Control when the LL system is used)
* Automatic Index Stop Switch . . . . . OFF
* LL Switch . . . . . NORMAL
* Audio Signal Generator Output 1kHz 1V, 0dB

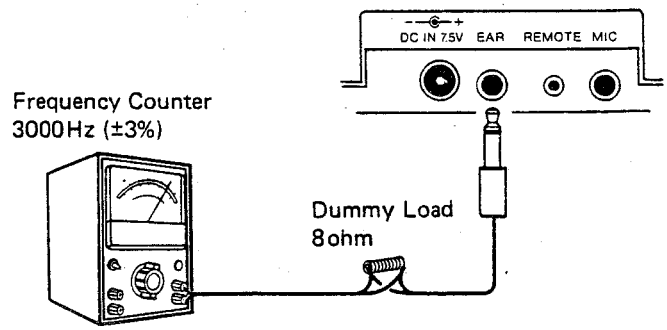
NOTE:

1. Short-circuit the pattern of the earphone jack with solder as illustrated when an adjustment work is performed.
2. Supply 7.5V DC from DC Constant-Voltage Regulator into the external power jack for the adjustments.

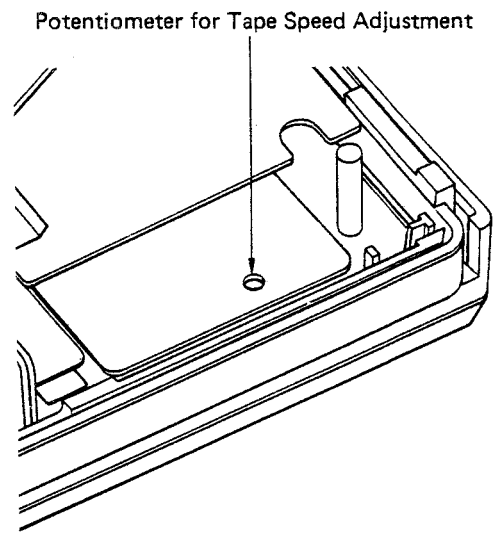


TAPE SPEED ADJUSTMENT

1. Connect the frequency counter to the earphone jack as illustrated and insert a 3kHz test tape (Example: TEAC MTT-111) into the cassette compartment.

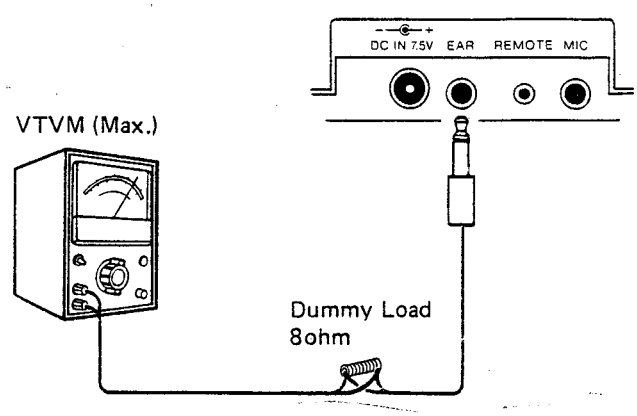


2. Check that the tape speed control is in the click position. Then, play back the test tape.
3. Turn the potentiometer (P1) on the Volume P.C.Board until the frequency counter reads 3,000Hz (±3%) while playing back the test tape.



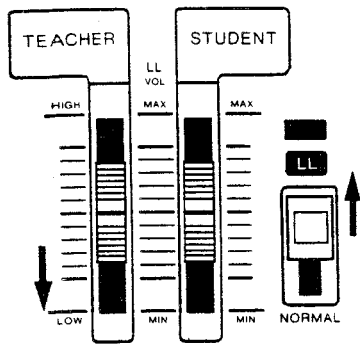
HEAD AZIMUTH ADJUSTMENT

1. Remove the cassette compartment lid and connect the VTVM to the earphone jack as illustrated and insert a 6.3kHz test tape (Example: TEAC MTT-113) into the cassette compartment.

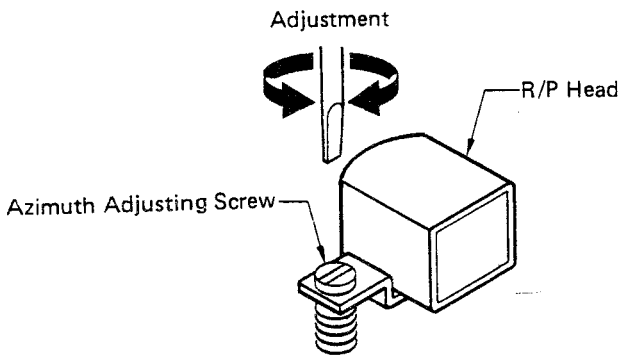


ELECTRICAL ADJUSTMENTS (Continued)

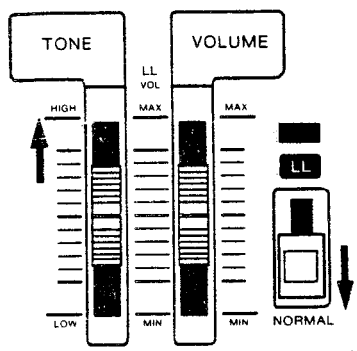
2. Set the LL switch to "LL" and the volume control on the teacher side to "Minimum" position as illustrated.



3. While playing back the test tape slowly turn the azimuth adjusting screw until the VTVM reads maximum.



4. Set the LL switch to "NORMAL" and the tone control to "Maximum" position as illustrated.



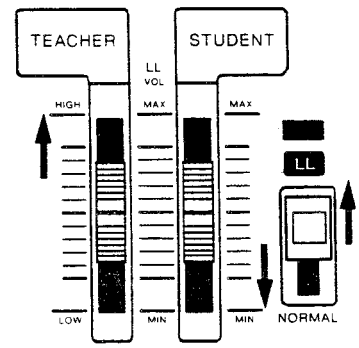
5. Perform the fine azimuth adjustment in the same method as in item 3.

6. After the adjustment, secure the azimuth adjusting screw with paint or glue.

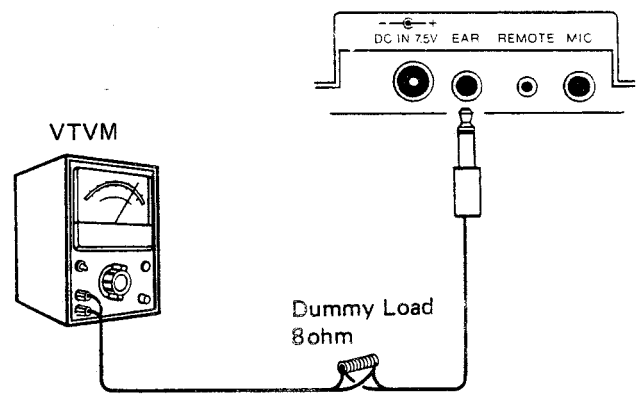
LL BIAS ADJUSTMENT

1. Insert a normal tape into the cassette compartment and set the LL switch to "LL".

2. Set the volume control on the teacher side to "maximum" position and volume control on the student side to "Minimum" position as illustrated.



3. Connect the VTVM to the earphone jack as illustrated and insert the erase plug into the microphone jack.

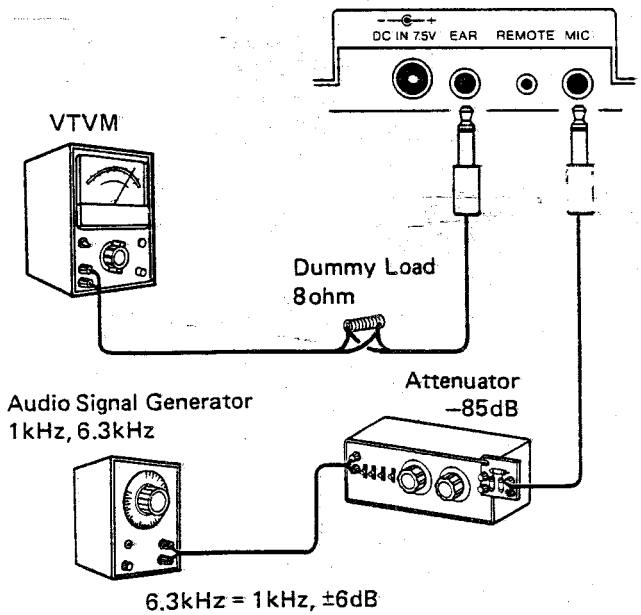


4. Set the unit in the recording mode by pressing the Record button. Then, turn the coil (L1) until the VTVM reads minimum at −10dB or less.

ELECTRICAL ADJUSTMENTS (Continued)

RECORD/PLAY FREQUENCY RESPONSE ADJUSTMENT

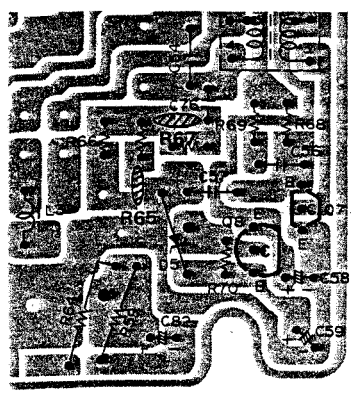
1. Connect the audio signal generator and the attenuator to the microphone jack, and the VTVM to the earphone jack as illustrated.



2. Insert a test tape for the recording and playback operations into the cassette compartment. Then, alternately record the 1kHz and 6.3kHz signals from the audio signal generator at –85dB (0.56mV) on the tape several times.

3. While playing back the recorded signals, check to see that the 6.3kHz signal output is identical to the 1kHz signal output or the deviation is ±6dB on the VTVM.

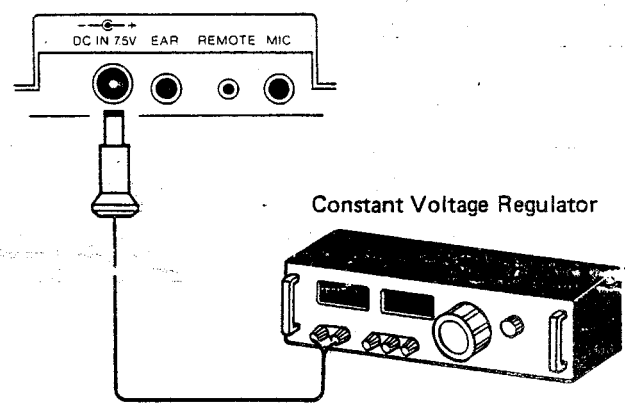
4. If necessary, adjust the output by connecting or disconnecting the patterns of the resistors R67 and R65.



5. After the adjustment, repeat the recording and playback operations of the signals and check that the specified output is obtained.

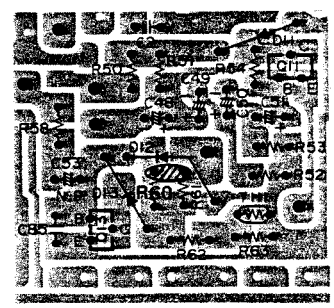
BATTERY CHECK LEVEL ADJUSTMENT

1. Connect the DC Constant-Voltage Regulator to the external power jack as illustrated and set the unit in the playback mode.



2. Gradually reduce the output of the regulator from 7.5V and check that the battery check lamp (LED) meets the following conditions.
   * The lamp goes on at 5.5V.
   * The lamp goes out at 5.0V.

3. If necessary, perform the following adjustments.
   A. Disconnect the pattern of the resistor R60 with a soldering iron and change the output (5.25V) by graduation of 1V. Then, check the voltage when the battey check lamp goes out.



   B. Connect the pattern of the resistor R60 and check the voltage when the battery check lamp goes out by following the same method as in Step A.
   C. Follow Steps A or B where the voltage close to 5.25V is obtained.

PARTS LIST

Ref. No.	Part No.	Description		Q'ty
	PACKAGE			
	141 6 1419 46603	Individual Carton		1
	141 6 1449 64200	Styrofoam Case		1
	141 6 1449 64500	Styrofoam Case		1
	141 6 2519 11390	Poly Cover Case		1
	141 6 4559 00100	Serial No. Sheet		3
	141 6 2519 16023	Poly Cover 160 x 230		2
	ACCESSORIES			
	4 1529 70011	Earphone		1
	4 2369 70232	Record Cord		1
	4 2369 71050	Plug		1
	141 2 1819 10600	Carrying Case		1
	142 6 4119 18202	Instruction Manual		1
	CABINET			
	4 1519 70602	Speaker (8Ω)		1
	141 0 1119 66501	Completed Cabinet Top		1
	141 0 1119 67303	Completed Cabinet Bottom		1
	141 0 1249 16200	LED Cassette Assy		1
	141 0 5519 06601	Eject Gear Assy		1
	141 2 1339 22300	Battery Lid		1
	141 2 1619 70500	Volume Knob		3
	141 2 1619 70600	LL Knob		1
	141 2 1619 70700	Switch Knob		1
	141 2 1619 70800	Switch Knob		1
	141 2 1719 21800	Handle		1
	141 2 2719 14100	Handle Holder		2
	141 2 2899 14000	Adhesive Sheet		15
	141 2 2899 24600	Sheet		5
	141 2 3229 29500	Shield Plate		1
	141 2 3679 28500	Jack Plate		1
	141 2 3729 02001	Speaker Bracket		2
	141 2 4469 16000	Cushion		1
	141 2 4569 06700	Washer		1
	141 2 4729 04100	Lug		1
	141 2 4729 05300	Wire Band		1
	141 2 7319 41100	Cum		1
	141 2 8519 91600	Spring, Cum		1
	143 3 1302 61011	Screw, Pan Hd. Tapping-B	+M2.6x10	4
	140 3 1303 01211	Screw, Pan Hd. Tapping-B	+M3.0x12	1
	101 3 1302 00413	Screw, Pan Hd.	+M2.0x4	1
	101 3 1302 00611	Screw, Pan Hd.	+M2.0x6	8
	101 3 1302 00613	Screw, Pan Hd.	+M2.0x6	3
	[illegible] 60811	Screw, Bind Hd. Tapping-2	+M2.6x8	1
	[illegible] 00011	Hex. Nut-1	M4.0	1
	[illegible] 00011	Finished Washer	M3.0	1
	110 3 9260 80082	Fiber Washer	M2.6x8.0x0.8	1
	MECHANISM			
S6	4 2319 74230	Power Switch Assy		1
S5	4 2319 74240	Leaf Switch Assy (F.FWD/REW)		1
HD1	4 2429 71610	R/P Head Assy		1
HD2	4 2429 71630	Erase Head Assy		1
	4 1539 70690	Microphone		1
	4 5279 70954	Motor		1
	141 0 3119 16702	Chassis Assy		1
	141 0 3169 05300	Pause Plate Assy		1
	141 0 3169 05400	Completed Chassis Bracket		1
	141 0 3169 05500	Volume Barcket Assy		1
	141 0 3789 01200	Motor Bracket Assy		1

Ref. No.	Part No.	Description		Q't
	141 0 5219 06600	Flywheel Assy		1
	141 0 5369 00702	Reel Plate Assy		1
	141 0 5369 01500	Completed Reel Plate		1
	141 0 5419 02900	Pinch Roller Assy		1
	141 0 5519 06202	Take-up Idler Assy		1
	141 0 7319 20600	Pause Slide Assy		1
	141 0 7319 20700	Slide Base Assy		1
	141 0 7319 20800	LL Plate Assy		1
	141 0 7419 20300	Select Crank Assy		1
	141 0 7419 25300	Record Lever Assy		1
	141 0 7419 25400	Lock Plate Assy		1
	141 0 7439 05800	Take-up Pully Arm Assy		1
	141 0 7439 06000	Senser Lever Assy		1
	141 0 7439 08200	Review Lever Assy		1
	141 0 8459 01400	Completed Flywheel Support		1
	141 2 1439 10000	Indicator Plate		1
	141 2 1619 69900	Stop Button		1
	141 2 1619 70000	Record Button		1
	141 2 1619 70100	Play Button		1
	141 2 1619 70200	Pause Button		1
	141 2 1619 70300	F.FWD Button		1
	141 2 1619 70400	Rewind Button		1
	141 2 3169 13700	Bracket		1
	141 2 3529 10100	Spacer, Pause Plate		1
	141 2 4179 01800	Nut		1
	141 2 4219 03000	Screw	+M2.0x3.0	2
	141 2 4219 10500	Screw	+M1.7x3.0	1
	141 2 4219 11400	Screw		2
	141 2 4219 03100	Screw	+M2.0x2.0	1
	141 2 4219 10800	Screw	+M2.0x2.5	10
	141 2 4459 15900	Cushion, Motor		2
	141 2 4459 24600	Mike Holder		1
	141 2 4469 29300	Flywheel Thrust		1
	141 2 4539 06900	Washer		1
	141 2 4539 08000	Washer		1
	141 2 4539 09300	Washer		1
	141 2 4539 09400	Washer		1
	141 2 4539 15700	Washer		3
	141 2 4539 17500	Washer		1
	141 2 4619 00901	Tube, Brake		1
	141 2 4629 00800	Coupling		1
	141 2 4729 04000	Lug		1
	141 2 5519 23300	F.FWD Gear		1
	141 2 5519 31500	Drive Idler		1
	141 2 5649 10800	Take-up Belt		1
	141 2 5649 15300	[illegible]		1
	141 2 5649 15600	Drive Belt		1
	141 2 5719 09000	Spacer		1
	141 2 5719 07700	Spacer		2
	141 2 5719 07800	Spacer		2
	141 2 5729 14100	Capstan Metal		1
	141 2 6129 05300	Spindle, Button		1
	141 2 7149 02700	Brake Plate		1
	141 2 7319 40000	Interlock Plate		1
	141 2 7419 52300	Shut-off Lever		1
	141 2 7419 55800	Eject Plate		1
	141 2 7419 63000	Stop Lever		1
	141 2 7419 63100	Select Lever		1
	141 2 7419 63200	Push Push Latch Plate		1
	141 2 7419 63500	Play Lever		1
	141 2 7419 63700	Pause Lever		1
	141 2 7419 63800	Fast Forward Lever		1
	141 2 7419 63900	Rewind Lever		1
	141 2 7439 15200	[illegible]rd Lock Lever		1

PARTS LIST (Continued)

Ref. No.	Part No.	Description		Q'ty
	141 2 7439 18200	Return Lever		1
	141 2 8119 08200	Counter		1
	141 2 8219 27900	Guide Lever		1
	141 2 8259 07700	Roller		1
	141 2 8519 05000	Spring, Power Switch Actuating Base		1
	141 2 8519 12200	Spring, Motor Lock		1
	141 2 8519 29400	Spring, Stop Lever		1
	141 2 8519 41100	Spring, Plate Lock		1
	141 2 8519 44100	Spring, Interlock		1
	141 2 8519 47400	Spring, Head		1
	141 2 8519 49800	Spring, F.FWD Lever		1
	141 2 8519 50701	Spring, Play Lever		1
	141 2 8519 57200	Spring, Stop Lever		1
	141 2 8519 71000	Spring, Slide Base		1
	141 2 8519 74700	Spring, Brake		1
	141 2 8519 91800	Spring, Lock Lid		1
	141 2 8519 91900	Spring, Pause Latch		1
	141 2 8519 98400	Spring, Pinch Roller		1
	141 2 8519 99800	Spring, LL Lever		1
	141 2 8519 63600	Spring, Brake		5
	141 2 8519 70300	Spring, Pause Plate		2
	141 2 8539 31500	Spring, Cassette		1
	141 2 8539 30702	Spring, Shield		1
	141 2 8549 05900	Spring, Stop		1
	101 3 1302 00311	Screw, Pan Hd.	+M2.0x3	1
	101 3 1302 00411	Screw, Pan Hd.	+M2.0x4	19
	101 3 1302 60411	Screw, Pan Hd.	+M2.6x4	1
	103 3 1302 00411	Screw, Pan Hd. Tapping-2	+M2.0x4	1
	101 3 2502 00811	Screw, Cylinder Hd.	-M2.0x8	1
	110 3 1102 00023	Sm. Round Washer	M2.0	3
	110 3 1102 60023	Sm. Round Washer	M2.6	1
	112 3 1301 20082	E Ring	M1.2	1
	112 3 1301 50082	E Ring	M1.5	13
	112 3 1302 00082	E Ring	M2.0	4
	112 3 1302 50082	E Ring	M2.5	1
	AMPLIFIER P.C.B. ASSY			
	4 1329 75511	Amplifier P.C.B. Assy		1
	141 2 2449 38000	Sheet		1
	141 2 3229 26200	Shield Plate		2
	141 2 4729 04700	Staple, 10mm		1
	141 2 4729 05000	Staple, 5mm		3
	141 2 4729 05800	Staple, 15mm		1
	201 2 2020 02201	Fin		1
S1	4 2319 73400	Slide Switch (Record/Play)		1
S2	4 2319 73642	Slide Switch (LL)		1
T1	4 2589 71630	OSC Coil		1
J1	4 2359 71780	Jack 1P (Mike)		1
J2	4 2359 71791	Jack 1P (Remote)		1
J3	4 2359 73470	Jack 1P (Earphone)		1
J4	4 2359 72950	Ext. Power Socket		1
L1	4 2729 70360	Coil (15mH)		1
L2	4 2729 70370	Coil (27mH)		1
L3	4 2729 70380	Coil (56mH)		1
HD3	4 2429 71650	Dummy Head		1
TH1	204 5 9000 01000	Thermister, SDT 100		1
D1	4 2029 71320	Diode, MA151WK		1
D2	4 2029 71320	Diode, MA151WK		1
D3	202 5 2810 44255	Diode, DS442		1
D4	205 5 9040 44280	Diode, DS442Y		1
D5	4 2029 71332	Diode, RD 4.7		1
D6	205 5 9040 44280	Diode, DS442		1
D7	202 5 2810 44255	Diode, DS442		1

Ref. No.	Part No.	Description				Q'ty
D8	4 2029 71320	Diode, MA151WK				1
D9	4 2029 71320	Diode, MA151WK				1
D11	202 5 3210 05620	Diode, GZA 5.6U				1
D12	202 5 9110 18820	Diode, 1S 188				1
D13	205 5 9040 44280	Diode, DS442Y				1
D15	202 5 9110 18820	Diode, 1S 188				1
D16	205 5 9040 44280	Diode, DS442				1
D18	205 5 9040 44280	Diode, DS442				1
D20	205 5 9040 44280	Diode, DS442				1
D21	205 5 9040 44280	Diode, DS442				1
IC1	206 5 0783 21011	IC, LA 3210				1
IC2	4 2069 70970	IC, LM 1818				1
IC3	4 2069 70542	IC, TBA820M				1
IC4	4 2069 70461	IC, LM324				1
Q1	4 2039 70720	Transistor, 2SD 601				1
Q2	4 2039 70720	Transistor, 2SD 601				1
Q3	4 2039 70730	Transistor, 2SB 709				1
Q4	4 2039 70720	Transistor, 2SD 601				1
Q5	4 2039 70720	Transistor, 2SD 601				1
Q6	4 2039 70720	Transistor, 2SD 601				1
Q7	203 5 5210 53660	Transistor, 2SC 536				1
Q8	203 5 6940 54560	Transistor, 2SD 545				1
Q9	4 2039 70720	Transistor, 2SD 601				1
Q10	4 2039 70720	Transistor, 2SD 601				1
Q11	4 2039 70721	Transistor, 2SD 601				1
Q12	4 2039 70720	Transistor, 2SD 601				1
Q13	4 2039 70720	Transistor, 2SD 601				1
Q14	4 2039 70730	Transistor, 2SB 709				1
Q15	203 5 6860 54460	Transistor, 2SB544				1
Q16	203 5 5210 53660	Transistor, 2SC 536				1
C1	CD1 0 5100 0000V	Electrolytic	1μF	10V		1
C2	CG1 5 2500 KH00A	Chip	0.0015μF	50V	± 10%	1
C3	CC1 0 1500 KE00C	Ceramic	100pF	50V	± 10%	1
C4	CG1 2 2500 KH00A	Chip	0.0012μF	50V	± 10%	1
C5	CD4 7 6100 0001V	Electrolytic	47μF	10V		1
C6	CD2 2 6100 0001V	Electrolytic	22μF	10V		1
C7	CD1 0 5100 0000V	Electrolytic	1μF	10V		1
C8	CD1 0 6100 0000V	Electrolytic	10μF	10V		1
C9	CC5 6 1500 KE00C	Ceramic	560pF	50V	± 10%	1
C10	CD1 0 7100 0001V	Electrolytic	100μF	10V		1
C11	CC1 5 1500 KE00C	Ceramic	150pF	50V	± 10%	1
C12	CD1 0 6100 0000V	Electrolytic	10μF	10V		1
C13	CM4 7 3500 K00SV	Mylar	0.047μF	50V	± 10%	1
C14	CD1 0 7100 0001V	Electrolytic	100μF	10V		1
C15	CT1 5 4350 M00DV	Tantalume	0.15μF	35V	± 20%	1
C16	CG1 0 2500 KH00A	Chip	0.001μF	50V	± 10%	1
C17	CD2 2 6100 0001V	Electrolytic	22μF	10V		1
C18	CG1 0 4250 ZI00A	Chip	0.1μF	25V	+80,-20%	1
C19	CD1 0 7100 0001V	Electrolytic	100μF	10V		1
C20	CD1 0 7100 0001V	Electrolytic	100μF	10V		1
C21	4 2239 70630	Capacitor	0.22μF			1
C23	CC2 2 1500 KE00C	Ceramic	220pF	50V	± 10%	1
C24	CD1 0 7100 0001V	Electrolytic	100μF	10V		1
C25	CD2 2 7100 0001V	Electrolytic	220μF	10V		1
C26	CI4 7 3250 KF00C	Boundary	0.047μF	25V	± 10%	1
C27	CD1 0 7100 0001V	Electrolytic	100μF	10V		1
C28	CI6 6 3250 KF00C	Boundary	0.068μF	25V	± 10%	1
C29	CD1 0 5500 0002V	Electrolytic	1μF	50V		1
C30	CG2 2 1500 KH00A	Chip	220pF	50V	± 10%	1
C31	CD4 7 663A 0002V	Electrolytic	47μF	6.3V		1
C32	CD3 3 4500 0002V	Electrolytic	0.33μF	50V		1
C33	CG3 3 2500 KH00A	Chip	0.0033μF	50V	± 10%	1
C34	CI4 7 3250 KF00C	Boundary	0.047μF	25V	± 10%	1
C35	CD1 0 7100 0001V	Electrolytic	100μF	10V		1

PARTS LIST (Continued)

Ref. No.	Part No.	Description			Q'ty
C36	CD1 0 6100 0002V	Electrolytic	10μF	10V	1
C37	CD1 0 5500 0002V	Electrolytic	1μF	50V	1
C38	CD1 0 5500 0002V	Electrolytic	1μF	50V	1
C39	CD4 7 4100 0002V	Electrolytic	0.47μF	10V	1
C40	CD1 0 4500 0002V	Electrolytic	0.1μF	50V	1
C41	CD1 0 6160 0002V	Electrolytic	10μF	16V	1
C42	CD1 0 4500 0002V	Electrolytic	0.1μF	50V	1
C43	CG4 7 2500 KH00A	Chip	0.0047μF	50V ± 10%	1
C44	CD1 0 4500 0002V	Electrolytic	0.1μF	50V	1
C45	CG3 3 2500 KH00A	Chip	0.0033μF	50V ± 10%	1
C46	CD1 0 6160 0002V	Electrolytic	10μF	16V	1
C47	CD1 0 7100 0001V	Electrolytic	100μF	10V	1
C48	CD4 7 5350 0002V	Electrolytic	4.7μF	35V	1
C49	CT4 7 4350 K00DV	Tantalume	0.47μF	35V ± 10%	1
C50	CT4 7 4350 K00DV	Tantalume	0.47μF	35V ± 10%	1
C51	CT4 7 4350 K00DV	Tantalume	0.47μF	35V ± 10%	1
C52	CD1 0 5500 0002V	Electrolytic	1μF	50V	1
C53	CB3 3 5160 0000V	None-polar	3.3μF	16V	1
C54	CP2 0 3101 J000V	Polypropylen	0.02μF	100V ± 5%	1
C56	CM1 0 3500 K00SV	Mylar	0.01μF	50V ± 10%	1
C57	CM5 6 2500 K00SV	Mylar	0.0056μF	50V ± 10%	1
C58	CD1 0 6100 0000V	Electrolytic	10μF	10V	1
C59	CD4 7 6100 0001V	Electrolytic	47μF	10V	1
C60	CD2 2 4500 0002V	Electrolytic	0.22μF	50V	1
C61	CG1 5 3500 KH00A	Chip	0.015μF	50V ± 10%	1
C62	CG1 5 3500 KH00A	Chip	0.015μF	50V ± 10%	1
C63	CG1 5 3500 KH00A	Chip	0.015μF	50V ± 10%	1
C64	CD2 2 4500 0002V	Electrolytic	0.22μF	50V	1
C65	CD3 3 4500 0002V	Electrolytic	0.33μF	50V	1
C66	CT1 5 5200 M00DV	Tantalume	1.5μF	20V ± 20%	1
C67	CD4 7 4100 0000V	Electrolytic	0.47μF	10V	1
C68	CD2 2 5100 0002V	Electrolytic	2.2μF	10V	1
C69	CB3 3 5160 0000V	None-polar	3.3μF	16V	1
C70	CD1 0 7100 0001V	Electrolytic	100μF	10V	1
C71	CD4 7 6100 0001V	Electrolytic	47μF	10V	1
C72	CD1 0 6160 0002V	Electrolytic	10μF	16V	1
C73	4 2239 70500	Capacitor	1000μF		1
C75	CG5 6 1500 KH00A	Chip	560pF	50V ± 10%	1
C76	CC2 7 1500 KE00C	Ceramic	270pF	50V ± 10%	1
C77	CG1 0 4250 ZI00A	Chip	0.1μF	25V +80,-20%	1
C78	4 2239 70190	Capacitor	0.1μF		1
C81	CG3 3 3250 MH00A	Chip	0.033μF	25V ± 20%	1
C82	CD1 0 6100 0000V	Electrolytic	10μF	10V	1
C83	CD1 0 5100 0000V	Electrolytic	1μF	10V	1
C85	CG1 5 3500 KH00A	Chip	0.015μF	50V ± 10%	1
C86	CD1 0 4500 0002V	Electrolytic	0.1μF	50V	1
C87	CG1 0 2500 KH00A	Chip	0.001μF	50V ± 10%	1
C88	CG1 0 2500 KH00A	Chip	0.001μF	50V ± 10%	1
C89	CG1 0 2500 KH00A	Chip	0.001μF	50V ± 10%	1
C90	CG3 3 2500 KH00A	Chip	0.0033μF	50V ± 10%	1
R1	RG4 7 4121 JA000	Chip	470kΩ	1/8W ± 5%	1
R2	RG1 8 3121 JA000	Chip	18kΩ	1/8W ± 5%	1
R3	RG1 0 2121 JA000	Chip	1kΩ	1/8W ± 5%	1
R4	RG2 2 3121 JA000	Chip	22kΩ	1/8W ± 5%	1
R5	RG5 6 2121 JA000	Chip	5.6kΩ	1/8W ± 5%	1
R6	RG5 6 3121 JA000	Chip	56kΩ	1/8W ± 5%	1
R7	RG5 6 2121 JA000	Chip	5.6kΩ	1/8W ± 5%	1
R8	RG6 8 1121 JA000	Chip	680Ω	1/8W ± 5%	1
R9	RG2 7 2121 JA000	Chip	2.7kΩ	1/8W ± 5%	1
R10	RG2 7 3121 JA000	Chip	27kΩ	1/8W ± 5%	1
R11	RG2 7 2121 JA000	Chip	2.7kΩ	1/8W ± 5%	1
R12	RG1 8 3121 JA000	Chip	18kΩ	1/8W ± 5%	1
R13	RG1 8 3121 JA000	Chip	18kΩ	1/8W ± 5%	1
R14	RG2 7 2121 JA000	Chip	2.7kΩ	1/8W ± 5%	1

Ref. No.	Part No.	Description			Q'ty
R15	RG5 6 0121 JA000	Chip	56Ω	1/8W ± 5%	1
R16	RG3 9 1121 JA000	Chip	390Ω	1/8W ± 5%	1
R17	RD1 0 A251 JS000	Carbon	1Ω	1/4W ± 5%	1
R18	RD2 7 0251 JS000	Carbon	27Ω	1/4W ± 5%	1
R19	RG3 9 1121 JA000	Chip	390Ω	1/8W ± 5%	1
R20	RG3 3 2121 JA000	Chip	3.3kΩ	1/8W ± 5%	1
R22	RG4 7 2121 JA000	Chip	4.7kΩ	1/8W ± 5%	1
R23	RG1 0 3121 JA000	Chip	10kΩ	1/8W ± 5%	1
R24	RG5 6 2121 JA000	Chip	5.6kΩ	1/8W ± 5%	1
R25	RG1 5 1121 JA000	Chip	150Ω	1/8W ± 5%	1
R26	RG1 8 1121 JA000	Chip	180Ω	1/8W ± 5%	1
R27	RG2 7 2121 JA000	Chip	2.7kΩ	1/8W ± 5%	1
R28	RG2 7 3121 JA000	Chip	27kΩ	1/8W ± 5%	1
R29	RG3 9 3121 JA000	Chip	39kΩ	1/8W ± 5%	1
R30	RG6 8 2121 JA000	Chip	6.8kΩ	1/8W ± 5%	1
R31	RG1 0 2121 JA000	Chip	1kΩ	1/8W ± 5%	1
R32	RG5 6 1121 JA000	Chip	560Ω	1/8W ± 5%	1
R33	RG2 2 4121 JA000	Chip	220kΩ	1/8W ± 5%	1
R34	RG6 8 4121 JA000	Chip	680kΩ	1/8W ± 5%	1
R35	RG3 9 3121 JA000	Chip	39kΩ	1/8W ± 5%	1
R36	RG4 7 3121 JA000	Chip	47kΩ	1/8W ± 5%	1
R37	RG1 0 3121 JA000	Chip	10kΩ	1/8W ± 5%	1
R38	RG1 8 2121 JA000	Chip	1.8kΩ	1/8W ± 5%	1
R39	RG6 8 2121 JA000	Chip	6.8kΩ	1/8W ± 5%	1
R40	RG2 7 2121 JA000	Chip	2.7kΩ	1/8W ± 5%	1
R41	RG1 0 3121 JA000	Chip	10kΩ	1/8W ± 5%	1
R42	RG1 0 3121 JA000	Chip	10kΩ	1/8W ± 5%	1
R43	RG3 3 5121 KA000	Chip	3.3MΩ	1/8W ± 10%	1
R44	RG1 0 2121 JA000	Chip	1kΩ	1/8W ± 5%	1
R45	RG1 0 3121 JA000	Chip	10kΩ	1/8W ± 5%	1
R46	RG1 0 4121 JA000	Chip	100kΩ	1/8W ± 5%	1
R47	RG8 2 0121 JA000	Chip	82Ω	1/8W ± 5%	1
R48	RG1 0 3121 JA000	Chip	10kΩ	1/8W ± 5%	1
R49	RG1 0 3121 JA000	Chip	10kΩ	1/8W ± 5%	1
R50	RG2 7 2121 JA000	Chip	2.7kΩ	1/8W ± 5%	1
R51	RG3 3 2121 JA000	Chip	3.3kΩ	1/8W ± 5%	1
R52	RG9 1 2121 JA000	Chip	9.1kΩ	1/8W ± 5%	1
R53	RG9 1 2121 JA000	Chip	9.1kΩ	1/8W ± 5%	1
R54	RG4 7 4121 JA000	Chip	470kΩ	1/8W ± 5%	1
R55	RG1 0 4121 JA000	Chip	100kΩ	1/8W ± 5%	1
R56	RG1 0 4121 JA000	Chip	100kΩ	1/8W ± 5%	1
R57	RG4 7 2121 JA000	Chip	4.7kΩ	1/8W ± 5%	1
R58	RG4 7 1121 JA000	Chip	470Ω	1/8W ± 5%	1
R59	RD1 8 2251 JS000	Carbon	1.8kΩ	1/4W ± 5%	1
R60	RG1 0 4121 JA000	Chip	100kΩ	1/8W ± 5%	1
R61	RG5 6 2121 JA000	Chip	5.6kΩ	1/8W ± 5%	1
R62	RG8 2 1121 JA000	Chip	820Ω	1/8W ± 5%	1
R63	RG8 2 1121 JA000	Chip	820Ω	1/8W ± 5%	1
R64	RD1 0 2251 JS000	Carbon	1kΩ	1/4W ± 5%	1
R65	RG2 2 2121 JA000	Chip	2.2kΩ	1/8W ± 5%	1
R66	RG5 6 2121 JA000	Chip	5.6kΩ	1/8W ± 5%	1
R67	RG1 0 3121 JA000	Chip	10kΩ	1/8W ± 5%	1
R68	RG1 8 3121 JA000	Chip	18kΩ	1/8W ± 5%	1
R69	RG3 3 1121 JA000	Chip	330Ω	1/8W ± 5%	1
R70	RG5 6 1121 JA000	Chip	560Ω	1/8W ± 5%	1
R71	RG1 0 4121 JA000	Chip	100kΩ	1/8W ± 5%	1
R72	RG4 7 3121 JA000	Chip	47kΩ	1/8W ± 5%	1
R73	RG2 2 3121 JA000	Chip	22kΩ	1/8W ± 5%	1
R74	RG2 7 3121 JA000	Chip	27kΩ	1/8W ± 5%	1
R75	RG2 7 3121 JA000	Chip	27kΩ	1/8W ± 5%	1
R76	RG1 0 4121 JA000	Chip	100kΩ	1/8W ± 5%	1
R77	RG1 0 4121 JA000	Chip	100kΩ	1/8W ± 5%	1
R78	RG2 7 3121 JA000	Chip	27kΩ	1/8W ± 5%	1
R79	RG1 0 4121 JA000	Chip	100kΩ	1/8W ± 5%	1

PARTS LIST (Continued)

Ref. No.	Part No.	Description				Q'ty
R80	RG6 8 3121 JA000	Chip	68kΩ	1/8W	± 5%	1
R81	RG1 0 5121 JA000	Chip	1MΩ	1/8W	± 5%	1
R82	RG6 8 2121 JA000	Chip	6.8kΩ	1/8W	± 5%	1
R83	RG5 6 3121 JA000	Chip	56kΩ	1/8W	± 5%	1
R84	RG1 0 4121 JA000	Chip	100kΩ	1/8W	± 5%	1
R85	RG3 9 3121 JA000	Chip	39kΩ	1/8W	± 5%	1
R86	RG3 3 5121 KA000	Chip	3.3MΩ	1/8W	± 10%	1
R87	RG4 7 3121 JA000	Chip	47kΩ	1/8W	± 5%	1
R88	RG1 0 4121 JA000	Chip	100kΩ	1/8W	± 5%	1
R89	RG1 5 3121 JA000	Chip	15kΩ	1/8W	± 5%	1
R90	RG3 3 4121 JA000	Chip	330kΩ	1/8W	± 5%	1
R91	RG1 0 4121 JA000	Chip	100kΩ	1/8W	± 5%	1
R92	RG4 7 4121 JA000	Chip	470kΩ	1/8W	± 5%	1
R93	RG1 0 3121 JA000	Chip	10kΩ	1/8W	± 5%	1
R94	RG2 2 1121 JA000	Chip	[illegible]Ω	1/8W	± 5%	1
R95	RG5 6 1121 JA000	Chip	560Ω	1/8W	± 5%	1
R96	RG4 7 3121 JA000	Chip	47kΩ	1/8W	± 5%	1
R97	RG1 0 4121 JA000	Chip	100kΩ	1/8W	± 5%	1
R98	RG4 7 3121 JA000	Chip	47kΩ	1/8W	± 5%	1
R99	RG1 0 3121 JA000	Chip	10kΩ	1/8W	± 5%	1
R100	RG2 2 3121 JA000	Chip	22kΩ	1/8W	± 5%	1
R101	RG1 0 3121 JA000	Chip	10kΩ	1/8W	± 5%	1
R102	RG1 0 3121 JA000	Chip	10kΩ	1/8W	± 5%	1
R103	RG3 9 3121 JA000	Chip	39kΩ	1/8W	± 5%	1
R104	RG2 2 3121 JA000	Chip	22kΩ	1/8W	± 5%	1
R105	RG1 0 3121 JA000	Chip	10kΩ	1/8W	± 5%	1
R106	RG1 0 3121 JA000	Chip	10kΩ	1/8W	± 5%	1
R107	RG1 0 3121 JA000	Chip	10kΩ	1/8W	± 5%	1
R113	RG1 0 3121 JA000	Chip	10kΩ	1/8W	± 5%	1
R114	RG1 0 3121 JA000	Chip	10kΩ	1/8W	± 5%	1
R115	RG4 7 3121 JA000	Chip	47kΩ	1/8W	± 5%	1
R117	RG1 2 2121 JA000	Chip	1.2kΩ	1/8W	± 5%	1
R200	RD6 8 A251 JS000	Carbon	6.8Ω	1/4W	± 5%	1
R201	RD1 0 0251 JS000	Carbon	10Ω	1/4W	± 5%	1
R202	RP3 6 1121 JH000	Pretty Carbon	360Ω	1/8W	± 5%	1
R203	RP6 8 0121 JH000	Pretty Carbon	68Ω	1/8W	± 5%	1
R204	RP6 8 1121 JH000	Pretty Carbon	680Ω	1/8W	± 5%	1
R205	RP1 3 2121 JH000	Pretty Carbon	1.3kΩ	1/8W	± 5%	1

REC./BATT. INDICATOR P.C.B. ASSY

	4 2269 32870	REC./BATT. Indicator P.C.B. Assy				1
	4 2269 32880	PCB, LED				1
D17	4 2029 70870	LED, SLP-137B (Record/Battery)				1
R116	RD2 7 2251 JN000	Carbon	2.7kΩ	1/4W	± 5%	1

LL INDICATOR P.C.B. ASSY

	4 2269 32890	LL Indicator P.C.B. Assy	1
	4 2269 32900	PCB, LED	1
D14	4 2029 71510	LED, SLP-441B (LL)	1

VOLUME CONTROL P.C.B. ASSY

	4 2269 32910	Volume Control P.C.B. Assy	1
	4 2439 71190	Lead	1
	4 2439 71200	Lead	1
P1	4 2229 73163	Potentio Meter (B-1kΩ)	1
VR1	4 2229 71990	Volume Control (Volume, A-10kΩ)	1
VR2	4 2229 71990	Volume Control (Tone, A-10kΩ)	1
VR3	4 2229 71991	Volume Control (Tape Speed, B-3kΩ)	1
Q17	203 5 5210 53660	Transistor, 2SC 536	1
Q18	203 5 4830 60860	Transistor, 2SA 608	1
Q19	203 5 4830 60860	Transistor, 2SA 608	1

Ref. No.	Part No.	Description				Q'ty
Q20	203 5 5210 53660	Transistor, 2SC 536				1
C84	CD1 0 4500 0002V	Electrolytic	0.1μF	50V		1
R206	RD1 0 1251 JN000	Carbon	100Ω	1/4W	± 5%	1
R207	RD2 0 2251 JN000	Carbon	2kΩ	1/4W	± 5%	1
R208	RD1 0 2251 JN000	Carbon	1kΩ	1/4W	± 5%	1
R209	RD4 7 2251 JN000	Carbon	4.7kΩ	1/4W	± 5%	1
R210	RD1 8 2251 JN000	Carbon	1.8kΩ	1/4W	± 5%	1
R211	RD2 2 4251 JN000	Carbon	220kΩ	1/4W	± 5%	1
R212	RD1 5 3251 JN000	Carbon	15kΩ	1/4W	± 5%	1
R213	RD1 0 1251 JN000	Carbon	100Ω	1/4W	± 5%	1

INDEX P.C.B. ASSY

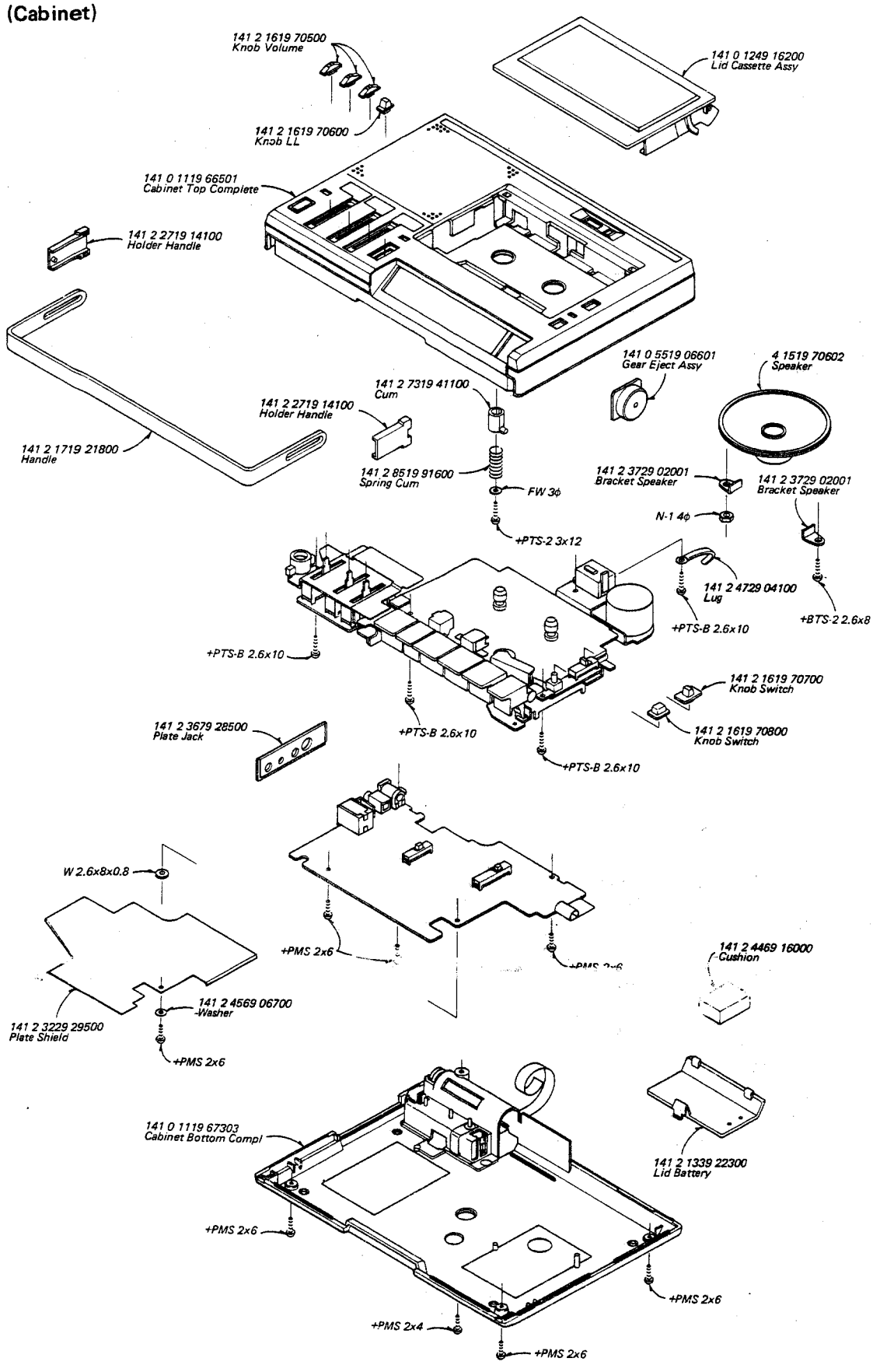
	4 2269 32930	Index P.C.B. Assy	1
	4 2269 32940	PCB, Cue	1
	4 2439 71180	Lead	1
S3	4 2319 74200	Slide Switch (Auto Index Stop)	1
S4	4 2319 74380	Push Switch (Index)	1
D10	4 2029 70871	LED, SLP-237B (Index)	1

NOTES:

1. Parts order must contain Model Number, Part Number and Description.
2. Ordering quantity of screws and resistors must be multiple of 10 pcs.

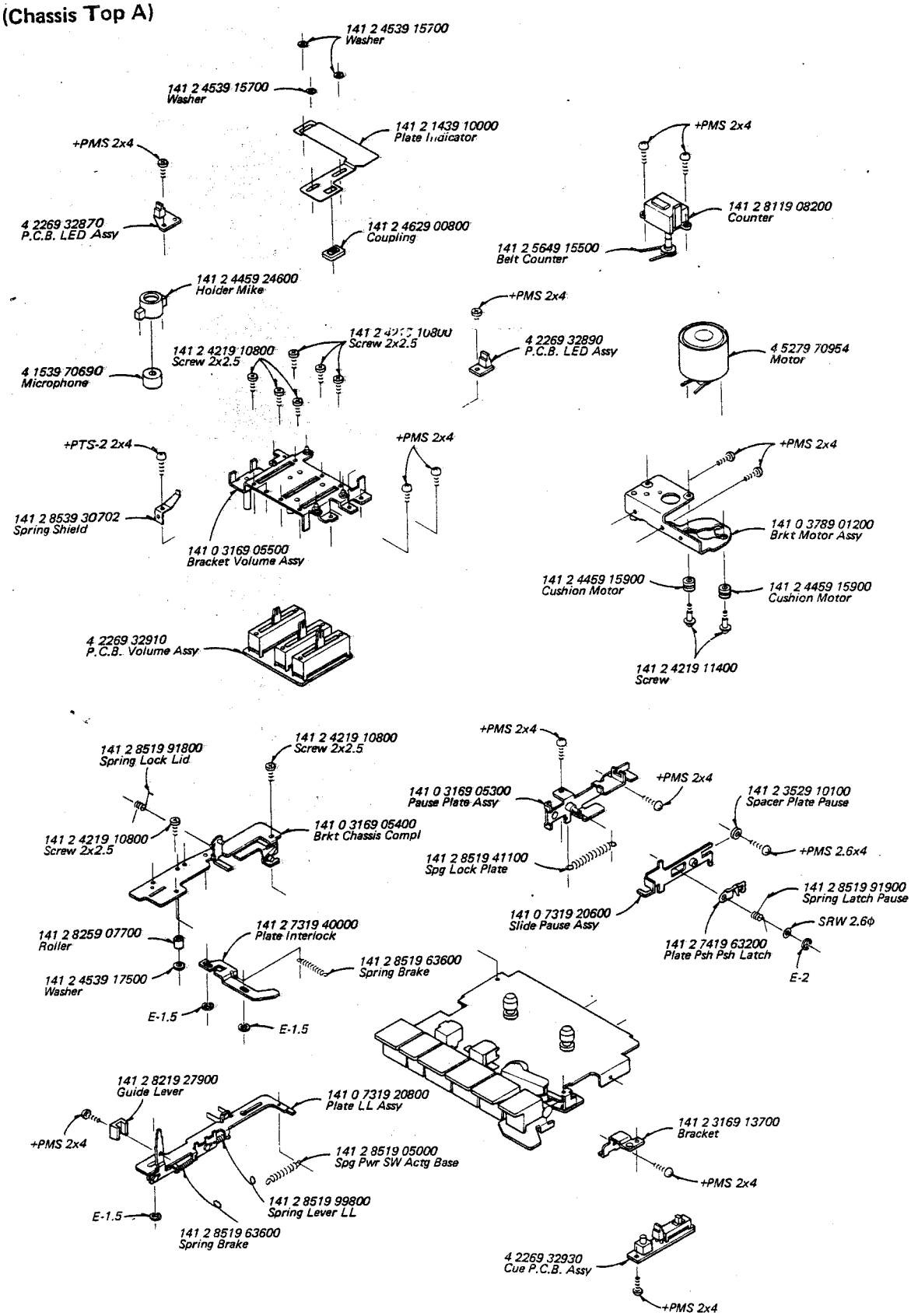
EXPLODED VIEW

(Cabinet)



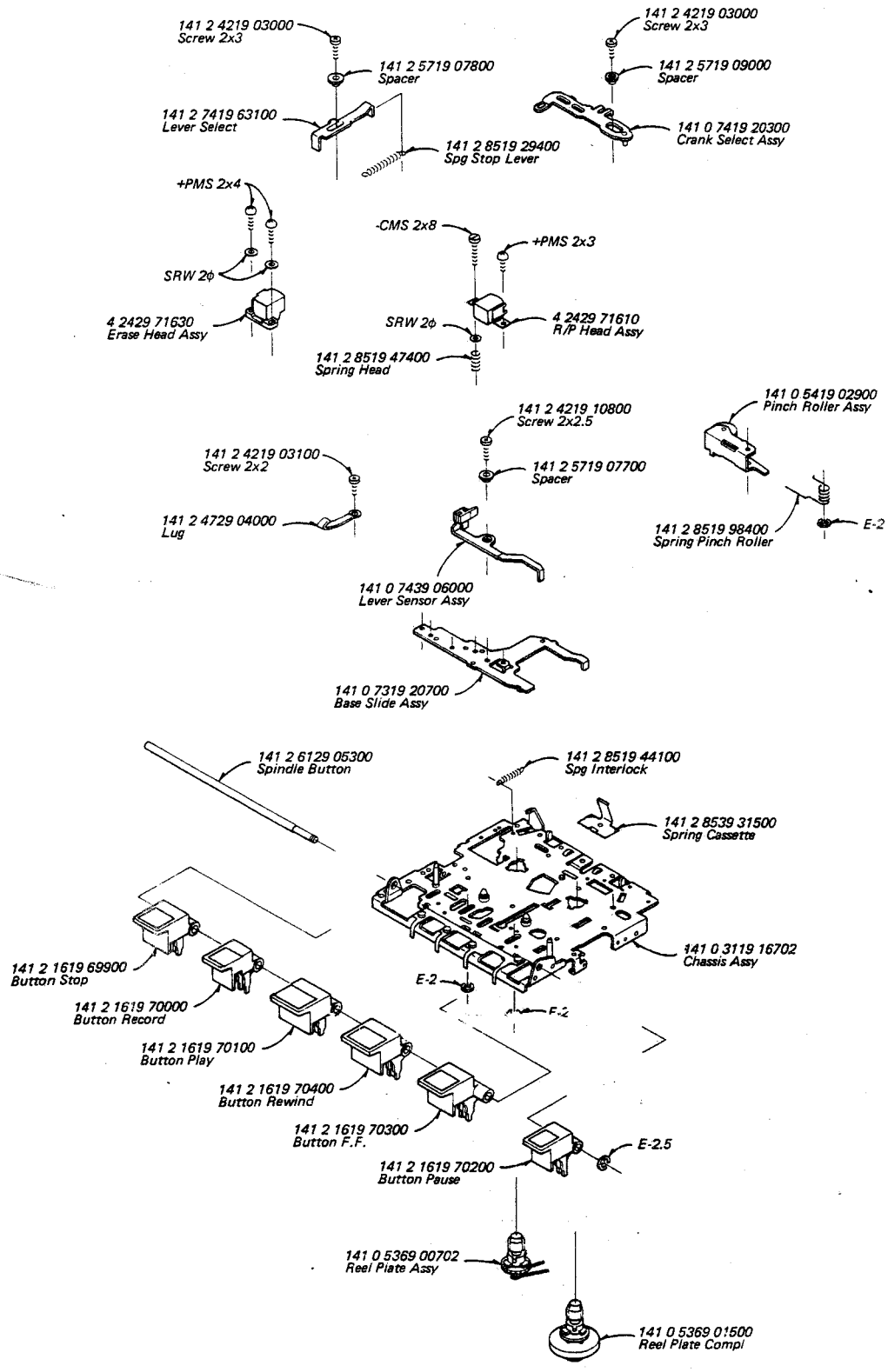
EXPLODED VIEW (Continued)

(Chassis Top A)



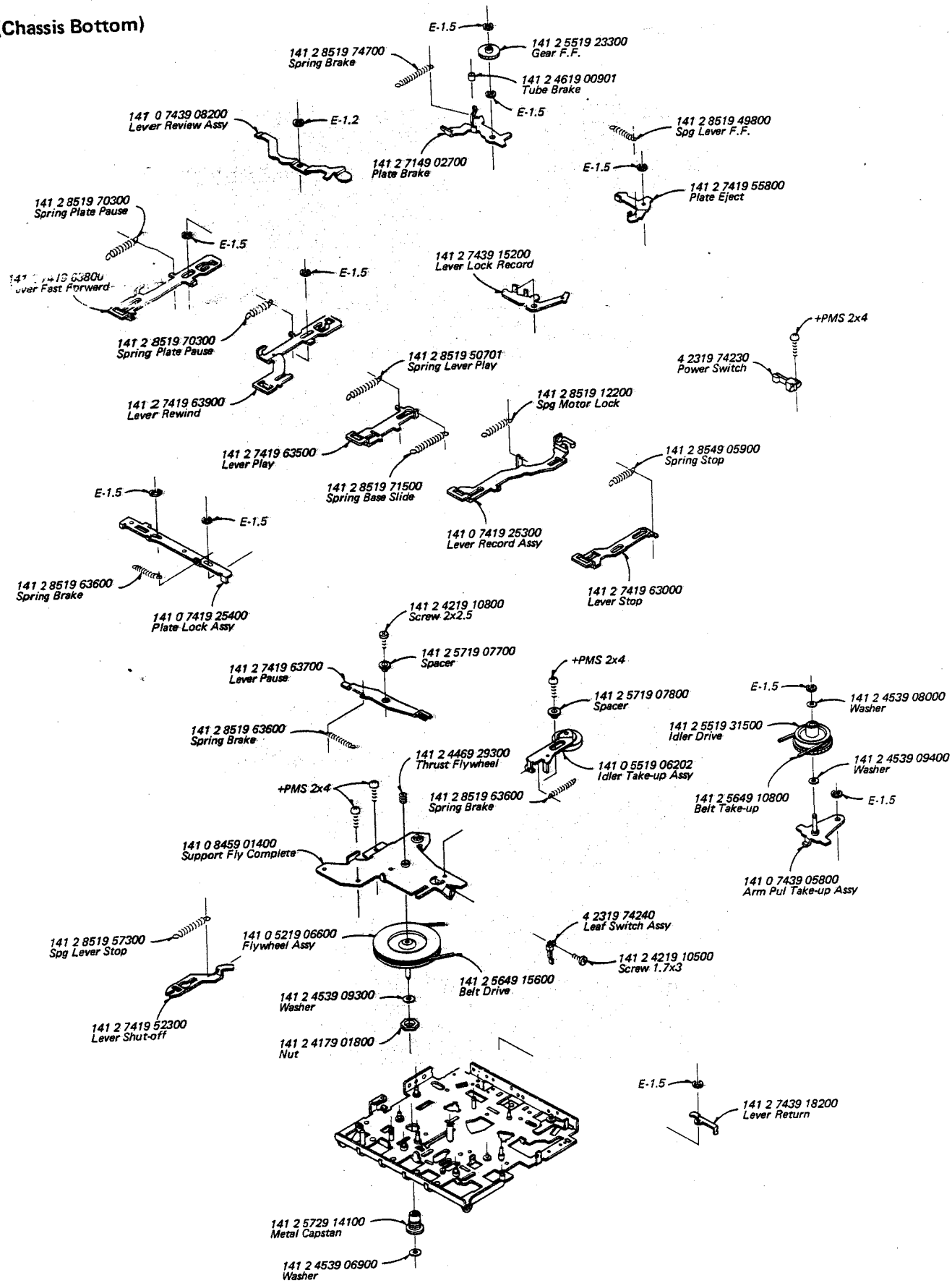
EXPLODED VIEW (Continued)

(Chassis Top B)



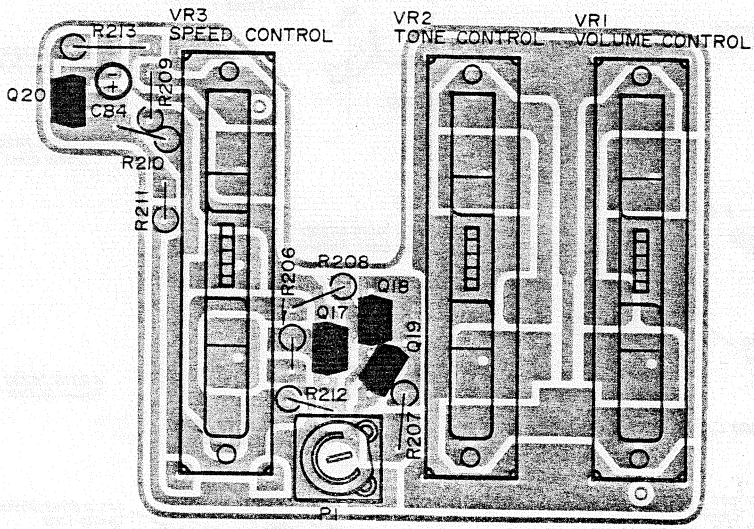
EXPLODED VIEW (Continued)

(Chassis Bottom)

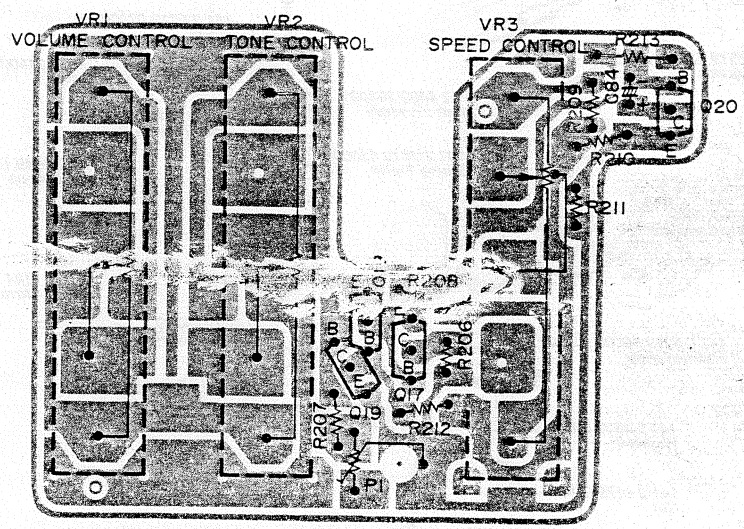


VOLUME CONTROL P.C.BOARD

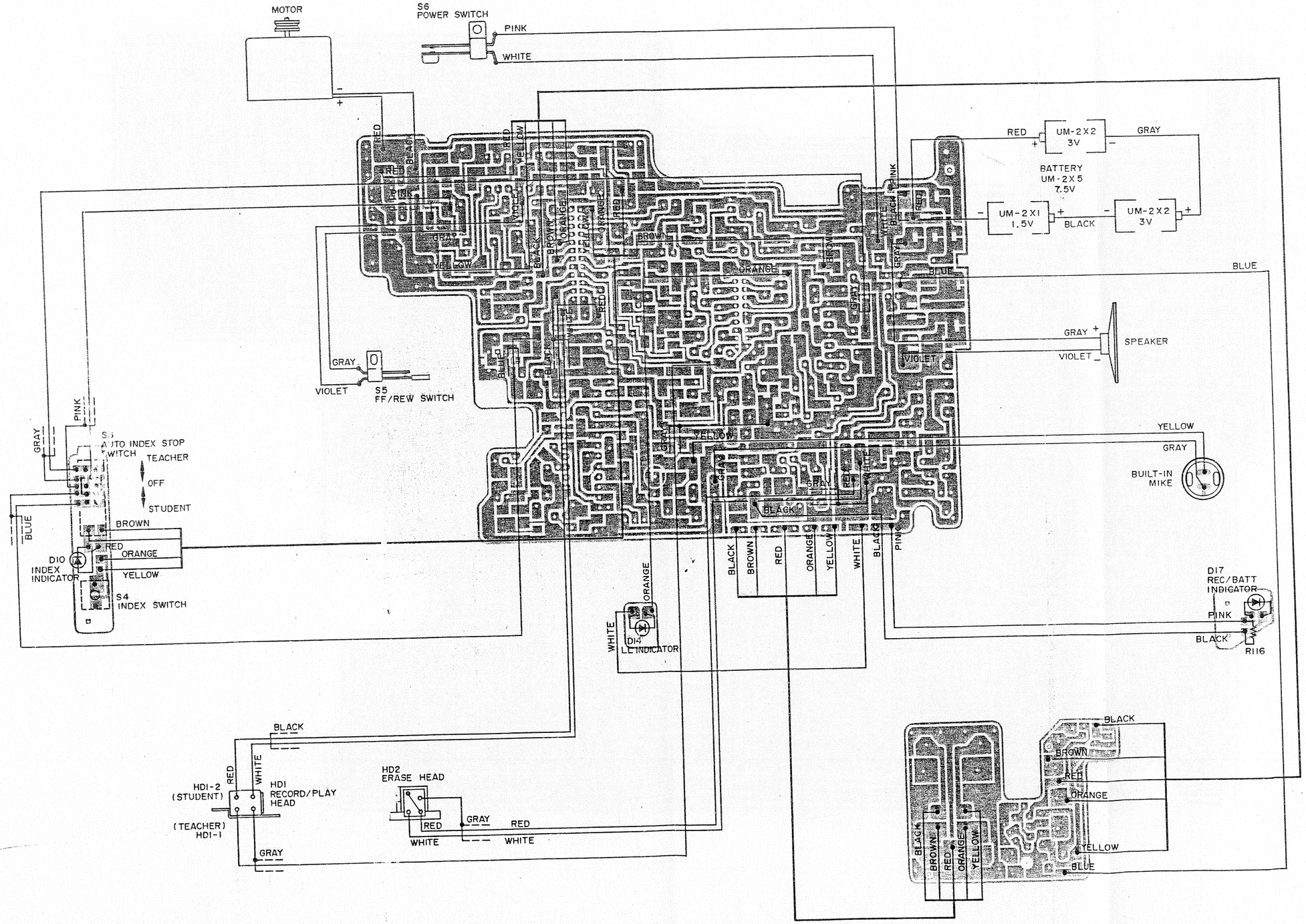
(Top View)



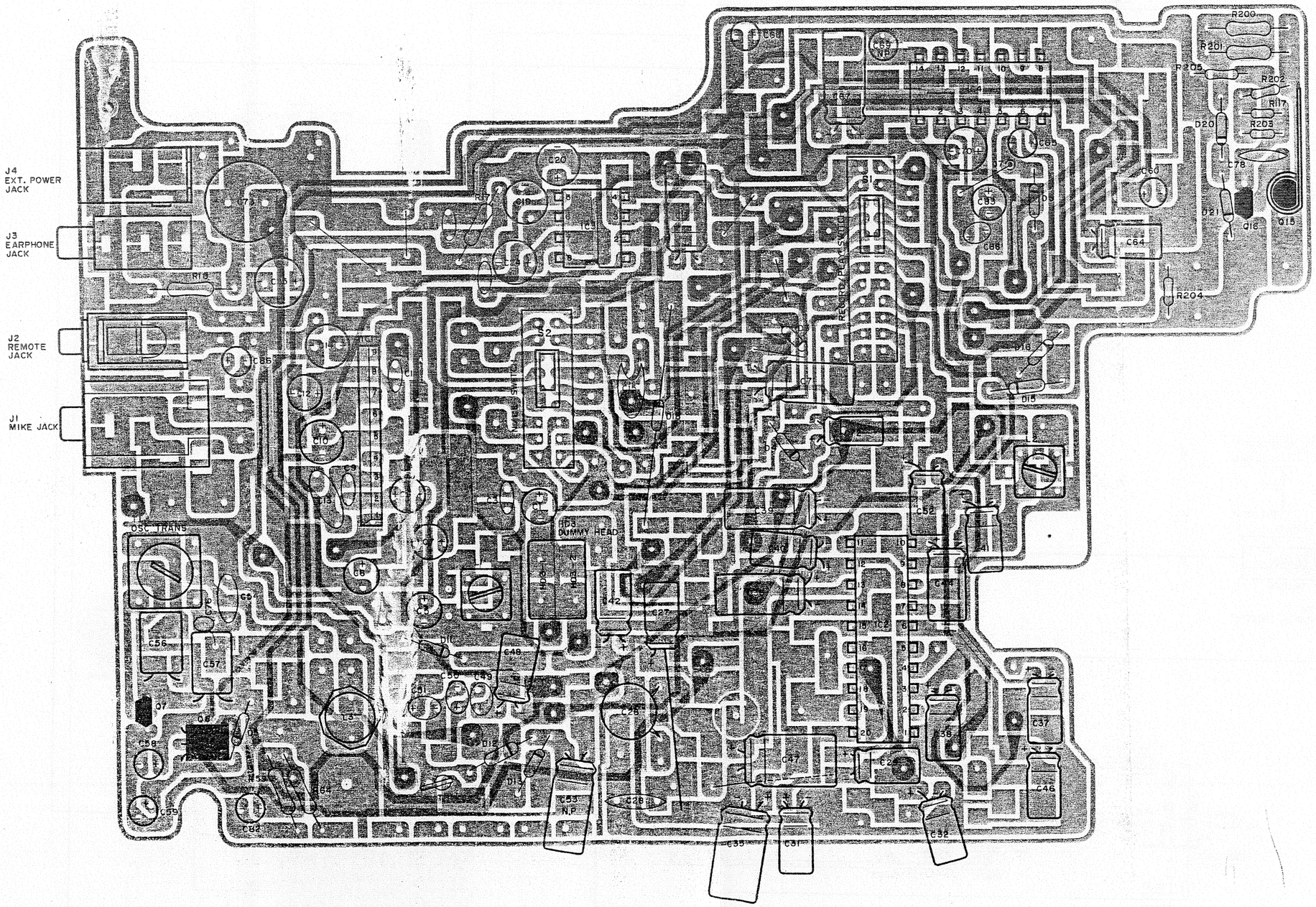
(Bottom View)



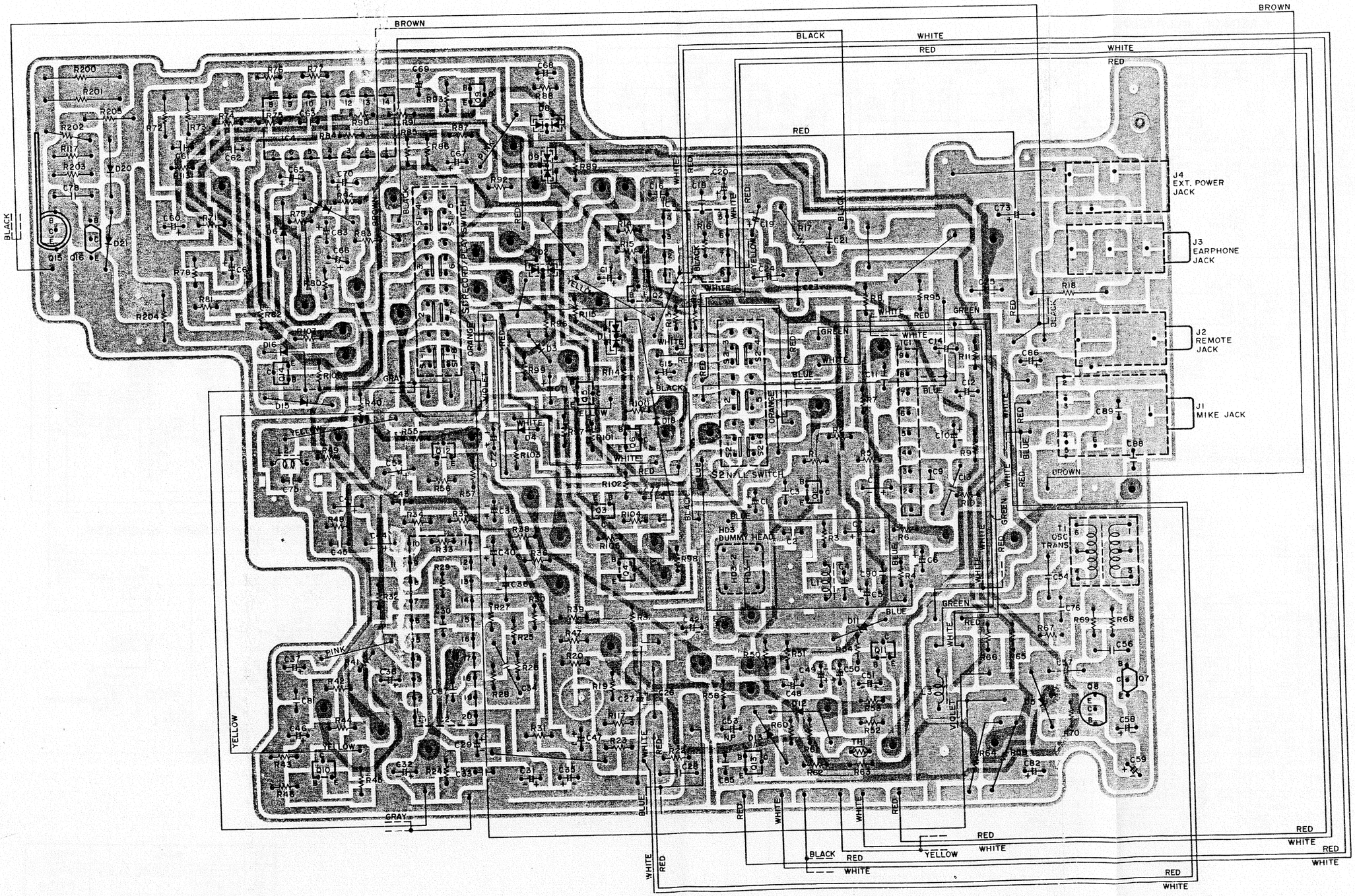
WIRING DIAGRAM



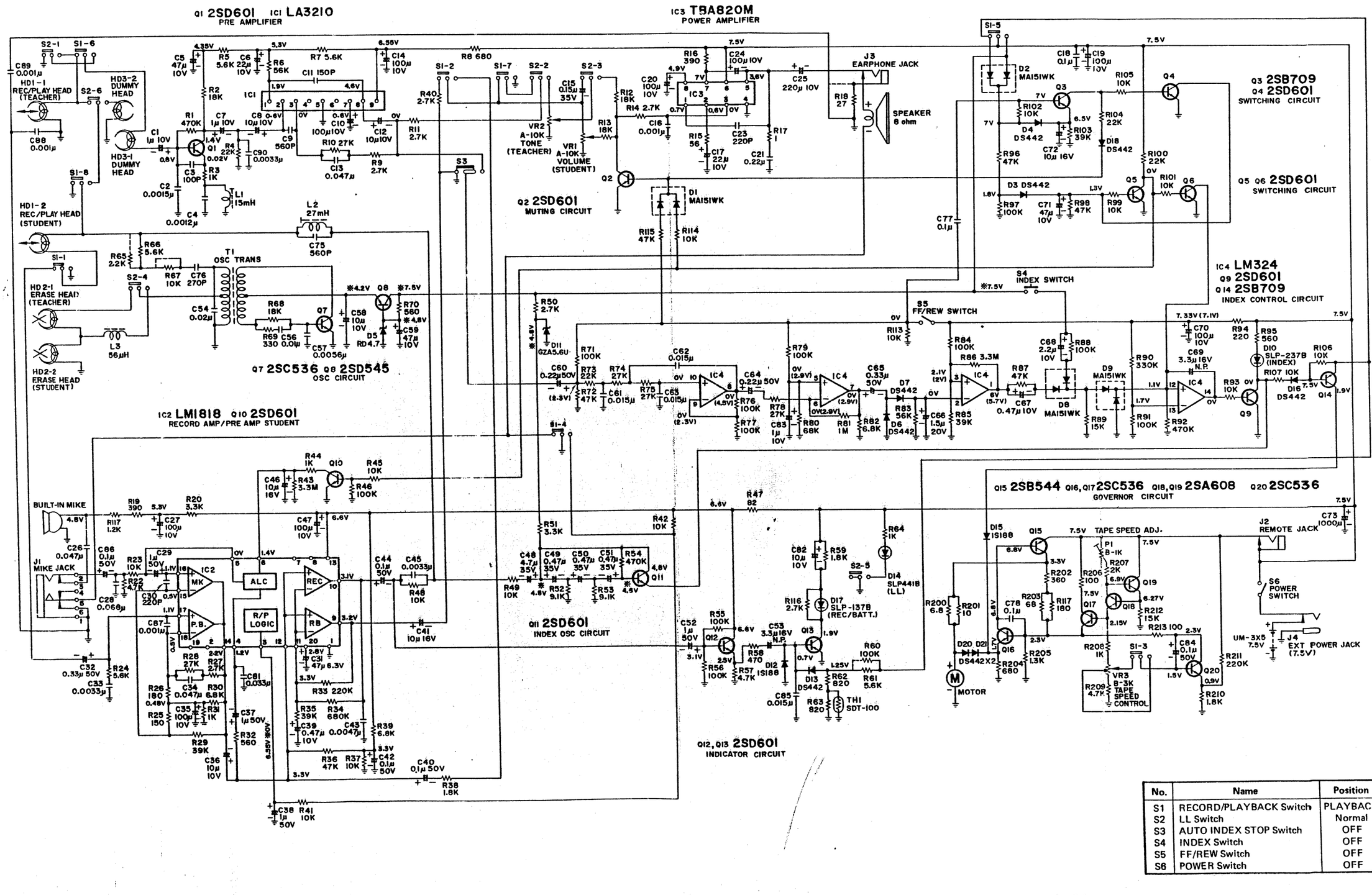
AMPLIFIER P.C.BOARD(Top View)



AMPLIFIER P.C.BOARD(Bottom View)

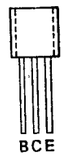
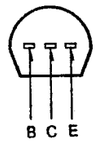
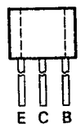
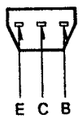
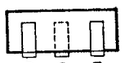
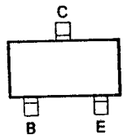
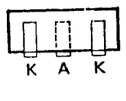
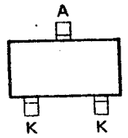
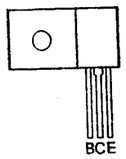
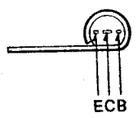


SCHEMATIC DIAGRAM



No.	Name	Position
S1	RECORD/PLAYBACK Switch	PLAYBACK
S2	LL Switch	Normal
S3	AUTO INDEX STOP Switch	OFF
S4	INDEX Switch	OFF
S5	FF/REW Switch	OFF
S6	POWER Switch	OFF

IC & TRANSISTOR LEAD IDENTIFICATION

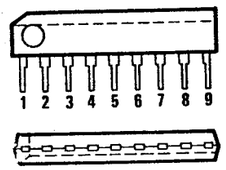
FRONT VIEW	BOTTOM VIEW	TRANSISTOR & DIODE
		2SB545
		2SC536 2SA608
		2SB709 2SD601
		MA151WK
		2SD544

TERMINAL NAMES

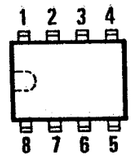
B⇒ BASE
C⇒ COLLECTOR
E⇒ EMITTER

A⇒ ANODE
K⇒ CATHODE

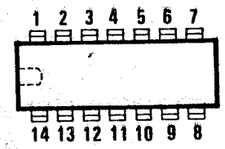
LA3210 FRONT VIEW & BOTTOM VIEW



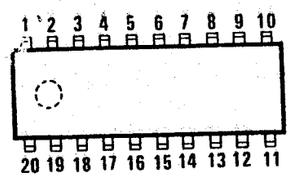
TBA 820M BOTTOM VIEW



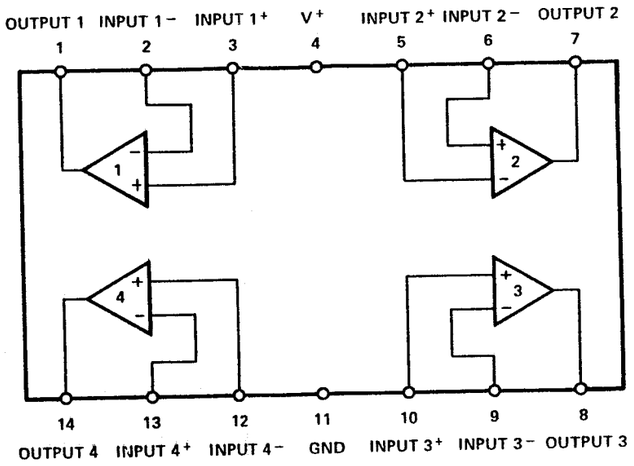
LM324 BOTTOM VIEW



LM1818 BOTTOM VIEW



LM324 BLOCK DIAGRAM



LM1818 BLOCK DIAGRAM